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Signed A W Brewer.

Dated **19 May 1999**

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Request for grant of a patent

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The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference — J1821

2. Patent application number *(The Patent Office will fill in this part)* — **9828317.9** — 23 DEC 1998

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

BASS PUBLIC LIMITED COMPANY
NO. 1 FIRST AVENUE
CENTRUM 100
BURTON-ON-TRENT
STAFFORDSHIRE

Patents ADP number *(if you know it)* 6439590001

If the applicant is a corporate body, give the country/state of its incorporation — ENGLAND

4. Title of the invention — SERVING CIDER

5. Name of your agent *(if you have one)* — BARKER BRETTELL

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

138 HAGLEY ROAD
EDGBASTON
BIRMINGHAM
B16 9PW

Patents ADP number *(if you know it)* — 7442494002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of Filing *(day/month/year)*
GB	9810309.6	15.05.98

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day/month/year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request *(Answer 'Yes' if:*
a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d)) — YES

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9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	-
Description	8 + 8
Claim(s)	3 + 3
Abstract	-
Drawing(s)	2 + 2 ✓

10. If you are also filing any of the following, state how many against each item.

Priority documents	-
Translations of priority documents	-
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	-
Request for preliminary examination *(Patents Form 9/77)*	1 ✓
Request for substantive examination *(Patents Form 10/77)*	-
Any other documents *(please specify)*	-

11. I/We request the grant of a patent on the basis of this application.

Signature: Barker Brettell
BARKER BRETTELL

Date: 22/12/98

12. Name and daytime telephone number of person to contact in the United Kingdom: JOHN LAWRENCE TEL: 0121-456 1364

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SERVING CIDER

This invention concerns severing cider, apparatus for serving cider, and also concerns cider in a vessel.

It is extremely difficult to serve a glass of draught cider with a head of froth or foam so that the head lasts for any appreciable time. Though it is possible to create a head by dispensing the cider from a font containing a sparkler, the head quickly disappears. Because the use of a sparkler slows the delivery rate of the cider, it takes longer to deliver a measured volume than if the sparkler were not used, and because the head quickly vanishes anyway some people think use of a sparkler pointless and take it off the font - sometimes without permission.

One object of the invention is to provide a method of serving draught cider containing a dissolved gas content so that a head on the delivered draught cider in a vessel, for example a drinking glass, is more stable and remains for a longer period of time than a head on cider served by hitherto known methods.

According to a first aspect of the invention there is provided a method of serving draught cider in an open-topped vessel and wherein said cider comprises a water content and a dissolved gas content, said method comprising cooling the cider to a temperature below the freezing point of water at ambient atmospheric pressure, and delivering the cooled cider into said vessel, said cooled cider being subjected to the effect of ultra-sound signals.

The cider may be cooled to a temperature in the range of substantially on -1°C to substantially -12°C. For example, the cider may be cooled to

substantially -6°C. The greater the alcohol strength by volume the lower the temperature to which the cider may be cooled.

If desired, the cooled cider may issue from a dispense outlet through a sparkler. However, the cooled cider may pass through an orifice plate in a dispense outlet from which the cider issues.

Preferably the open-topped vessel is chilled before receiving the cider. The vessel may be chilled to substantially 4°C or may be chilled to a temperature lower than 4°C. For example, the vessel may be chilled to substantially 0°C.

Said ultra-sound signals may have a frequency in the range of substantially 20kHz to substantially 70kHz. For example, the ultra-sound signals may have a frequency of substantially 30kHz.

The ultra-sound signals can be applied externally of said vessel to said vessel.

The ultra-sound signals may be applied internally of said vessel to the cooled cider. Thus an ultra-sonic signal emitter may be disposed in the cider in the vessel for emitting ultra-sound signals into the cider in the vessel.

A or the dispense outlet from which the cooled cider issues into said vessel may be adapted to act as an ultra-sonic signal emitter to provide aforesaid ultra-sound signals. Aforesaid ultra-sound signals may be applied to aforesaid cider flowing though the dispense outlet.

The dissolved gas content may comprise carbon dioxide and/or nitrogen. The carbon dioxide may approach zero % by volume or be greater, and/or the nitrogen content may approach zero parts per million (p.p.m.) or be greater, for example, the carbon dioxide content may be substantially 1.8% by volume and/or the nitrogen content may be substantially 18 parts per million (p.p.m.).

According to a second aspect of the invention there is provided cider in an open-topped vessel wherein said cider has a water content, and wherein said cider has a head of foam over ice, said ice being formed from water of said water content. In said cider according to said second aspect of the invention, said head and ice may be produced at least in part by performance of said method according to the first aspect.

According to a third aspect of the invention there is provided a method of sustaining a head on cider in an open-topped vessel wherein said cider comprises a water content and a dissolved gas content, said method comprising providing a head on the cider and forming ice in the cider from water of said water content, and in said vessel said ice forming a layer covered by said head. In said method according to the third aspect of the invention, said head and ice may be produced at least in part by performance of said method according to the first aspect.

The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a diagrammatic view of apparatus for delivering cooled draught cider;

Figure 2 is a diagrammatic view showing in side elevation a drinking vessel filled with cider delivered by the apparatus in Figure 1, the vessel being shown standing on apparatus represented diagrammatically to apply ultra-sound signals to the cider;

Figures 3 and 4 show diagrammatically in side elevation successive changes in the development of or variations in the head on the cider subsequent to the cider being subjected to ultra-sound signals and also to development of or variations in ice formed in the cider;

Figure 5 is a diagrammatic view of an alternative method of applying ultra-sound signals to the cider, and

Figure 6 is a diagrammatic view of yet a further method of applying ultra-sound signals to the cider.

With reference to Figure 1 apparatus to supply cider on draught is indicated at 2.

The draught cider is stored in a keg or cask 4. As stated above, the draught cider has a water content and a dissolved gas content.

This gas may be any suitable non-oxidising gas, for example carbon dioxide and/or nitrogen. The amount of gas dissolved in the cider may be within the usual known range for ciders.

The dissolved carbon dioxide content may be substantially 1.8% by volume, and/or the dissolved nitrogen content may be substantially 18 parts per million (p.p.m.).

A pump 6 is provided to pump cider from the cask 4, through a non-return valve 7 and along a pipe 8 in a chilled python known per se (not shown); the pipe comprising a heat exchange coil 10 in a remote cooling system know per se. The pipe 8 leads a chilling coil 12 in a bath 14 of a chiller 16, from which coil a pipe 8A leads to a manual valve 18 (know per se) of a dispense outlet or nozzle 20 which may be provided at or on a drink's bar. Bath 14 contains an ethylene glycol and water cooling mixture 22, for example 50% glycol and 50% water. The cooling mixture 22 is cooled by an evaporator 24 of a refrigeration unit 26 comprising a condenser 28, a refrigerant pump 30, and an expansion arrangement 32. A pump 34 circulates the cold mixture 22 through piping 36 forming another python 38 with the pipe 8A.

In known manner, a blanket or atmosphere of non-oxidising gas (for example carbon dioxide and/or nitrogen) from a suitable supply 40 (via a pressure regulator 42) provides a top pressure in the cask 4 and assists the pump 6 in the extraction of the cider.

The top gas pressure in the cask 4 may be substantially 206.84kN/m^2 (30lbs./in^2).

The pump 6 may develop a pressure in pipes 8, 8A of substantially 517.12kN/m^2 to substantially 551.58KN/m^2 (75 to 80 lbs./m^2). Normally pump 6 is not operating, thus when the valve 18 is opened the pump pressure stored in the pipes 8, 8A drops to below a per-determined desired value which is observed by pressure switch 44 of a pump control (not shown) causing the pump 6 to operate to provide a pump output pressure of substantially 75 to 80 lbs/in^2. The chiller 16 is arranged to cool the cider passing through to the outlet nozzle 210 to a per-determined

temperature in the range of substantially -1°C to substantially -12°C, for example -6°C. The cider reaches the nozzle 20 at that pre-determined temperature and issues therefrom into an open-topped vessel 46 (Fig. 2) which may be a drinking vessel, for example a drinking glass. In Fig. 1 the cider issuing from the outlet opening of the outlet nozzle 20 passes through a sparkler 47 (know per se). Instead of or in addition to said sparkler 47, a known orifice plate may be mounted in nozzle 20. But if desired, neither an orifice plate nor a sparkler may be fitted.

When valve 18 is closed, the pressure switch 44 observes a build-up in pressure in the pipes 8, 8A above a predetermined value and the control switches off the pump 6.

With reference to Fig. 2, the draught cider 48 is delivered from the outlet 20 (Fig. 1) into the drinking vessel 46, for example a glass which is preferably rather tall and preferably has a clear or transparent wall. Preferably the vessel 46 is chilled before it receives the beer. The vessel 46 may be chilled to a temperature of substantially 4°C or less. For example a known bottle chiller may be used to chill the vessel to substantially 4°C whilst a known glass froster may chill the vessel to substantially 0°C. A head of foam is shown at 50 and preferably this is some way below the top of the vessel 46 when the vessel contains a full measured volume, for example a pint, of the cider.

Immediately the cold cider 50 is poured into the chilled vessel 46, the vessel is placed in a shallow depth of water 52 in a dish part 54 of an ultra-sound generating apparatus 56 in which the dish 54 is securely mounted or affixed against a base part 58 containing an ultra-sound emitter 60. The emitter 60 may be arranged to emit ultra-sound signals in a frequency range of substantially 20kHz to 70kHz. For example the

cider may be subject to ultra-sound signals of a frequency of substantially 30 kHz or some other frequency selected from the aforesaid range, the water layer 52 providing an ultra-sonic transmission path or coupling. The cider 50 may be subject to the ultra-sound for any desired period, though usually a short period of a few seconds, for example substantially one to five seconds and more specifically about five seconds.

The result in a short time is shown in Fig. 3 in which the exposure to ultra-sonic signals has promoted sudden formation of bubbles of dissolved gas throughout the liquid cider 48 some bubbles 52A may be relatively large whilst others 52B may be relatively small and may tend to collect linearly in wavy lines which may snake upwardly. Also the head 50 may rise to increases in height or depth. The gas bubbles form nucleation sites encouraging the quick formation of ice in the cider 50 from water of the water content of the cider. This ice rises. It may be of a slushy character and tends to agglomerate in the lower part of and below the head 50 to form a slushy mass of ice 62 such as indicated in Fig. 4 in the cider.

Going from the stage shown in Fig. 2 to that in Fig. 4 may only take one or two minutes so that the gas bubbling and the formation and visible development of the ice takes place fairly quickly and be interesting phenomena to observe through the glass 46.

Besides the ice forming in the cider 46 being an intriguing sight, it helps show the customer the cider is cold and that it has not been diluted by addition of ice from water other than that already in the cider.

One of the most interesting feature is that the head 50 on the glass of cider may last for a considerable time i.e. several times the duration of a head on cider arising from known methods. The head 50 may last for

twenty minutes or so. Its longevity may be due to (i) the mass of ice 62 acting as a seal or barrier to gas attempting to leave the liquid cider body, and/or (ii) the fact that the ice 62 is keeping the head 50 cold.

An alternative method of applying the ultra-sound signals is represented in Fig. 5, in which after the apparatus 2 in Fig. 1 has dispensed a vessel or glass 46 of cider 48 an ultra-sound probe 64 powered through cable 66 is dipped into the cider for emitter 60A to give out ultra-sound signals. The probe 64 may be inserted into the cider before the full measured amount is supplied to the vessel 46.

In Fig. 6, the dispense outlet 20 has been arranged to act as an ultra-sonic probe, for example by providing it with an ultra-sonic emitter 60B. The ultra-sonic probe 20 in Fig. 6 may emit ultra-sound signals whilst cider is passing through it to the vessel 46, and/or may become partially immersed in the cider as shown and emit ultra-sound signals into the cider 48 in the vessel 46 whilst the measured volume of cider is still being supplied or after it has been supplied.

CLAIMS

1. A method of serving draught cider in an open-topped vessel and wherein said cider comprises a water content and a dissolved gas content, said method comprising cooling the cider to a temperature below the freezing point of water at ambient atmospheric pressure, and delivering the cooled cider into said vessel, said cooled cider being subjected to the effect of ultra-sound signals.

2, A method as claimed in claim 1, in which the cider is cooled to a temperature in the range of substantially -1°C to substantially -12°C.

3. A method as claimed in claim 2, in which the cider is cooled to a temperature of substantially -6°C.

4. A method as claimed in any one preceding claim, in which the cooled cider issues from a dispense outlet through a sparkler.

5. A method as claimed in any one of claims 1 to 3, in which the cooled cider passes through an orifice plate in a dispense outlet from which the cider issues.

6. A method as claimed in any one of claims 1 to 5, in which the open-topped vessel is chilled before receiving the cider.

7. A method as claimed in claim 6, in which the open-topped vessel is chilled to substantially 4°C or chilled to a temperature lower than 4°C.

8. A method as claimed in claim 7, in which the open-topped vessel is chilled to substantially 0°C.

9. A method as claimed in any one preceding claim, in which said ultra-sound signals have a frequency in the range of substantially 20kHz to substantially 70 kHz.

10. A method as claimed in claim 9, in which the ultra-sound signals have a frequency of substantially 30kHz.

11. A method as claimed in any one of claims 1 to 10, in which the ultra-sound signals are applied externally of said vessel to said vessel.

12. A method as claimed in any one of claims 1 to 10, in which the ultra-sound signals are applied internally of said vessel to the cooled cider.

13. A method as claimed in claim 13 in which an ultra-sonic signal emitter is disposed in the cider in the vessel for emitting ultra-sound signals into the cider in the vessel.

14. A method as claimed in any one of claims 11 to 12, in which a or the dispense outlet from which the cooled cider issues into said vessel is adapted to act as an ultra-sonic signal emitter to produce aforesaid ultra-sound signals.

15. A method as claimed in claim 14, in which aforesaid ultra-sound signals are applied to aforesaid cider flowing through the dispense outlet.

16. A method as claimed in any one of claims 1 to 15, in which the dissolved gas content comprises carbon dioxide and/or nitrogen.

17. A method as claimed in claim 16, in which the carbon dioxide content is substantially zero % by volume or greater and/or the nitrogen content is substantially zero parts per million (p.p.m.) or greater.

18. Cider in an open-topped vessel wherein said cider comprises a dissolved gas content and a water content, and wherein said cider has a head of foam over ice, said ice being formed in the cider from water of said water content.

19. Cider as claimed in claim 18, in which said head and ice are produced at least in part by performance of a method as claimed in any one of claims 1 to 14.

20. A method of sustaining a head on cider in an open-topped vessel said method comprising providing a head on the cider and forming ice in the cider from water of said water content, and in said vessel said ice forming a layer covered by said head.

21. A method as claimed in claim 20, in which said head and ice are produced at least in part by performance of a method as claimed in any one of claims 1 to 14.

22. A method of serving draught cider in an open-topped vessel substantially as hereinbefore described with reference to Figs. 1 to 4, or Figs. 1 and 3 to 5 or Figs. 1, 3, 4 and 6 of the accompanying drawings

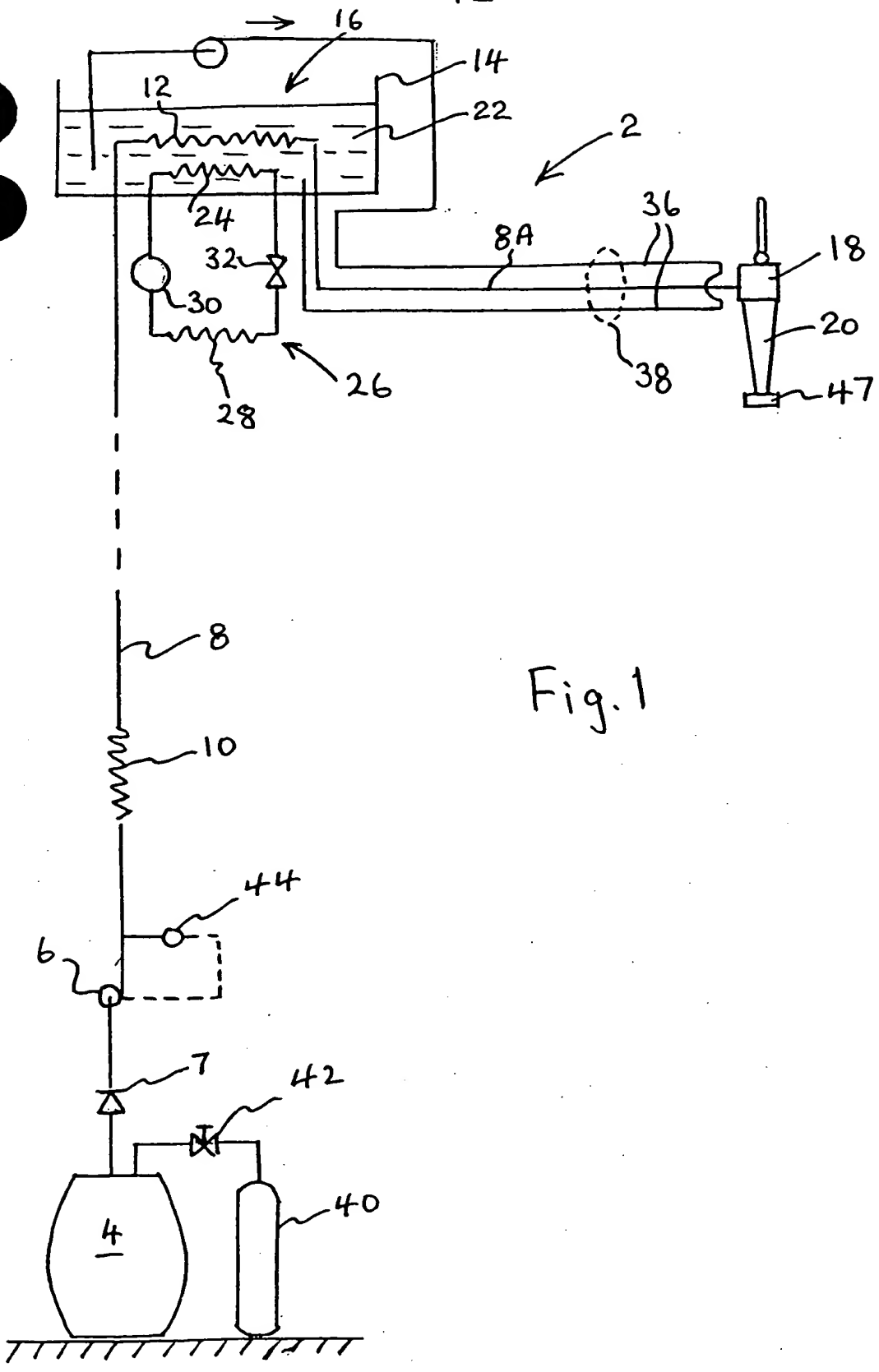

Fig. 1

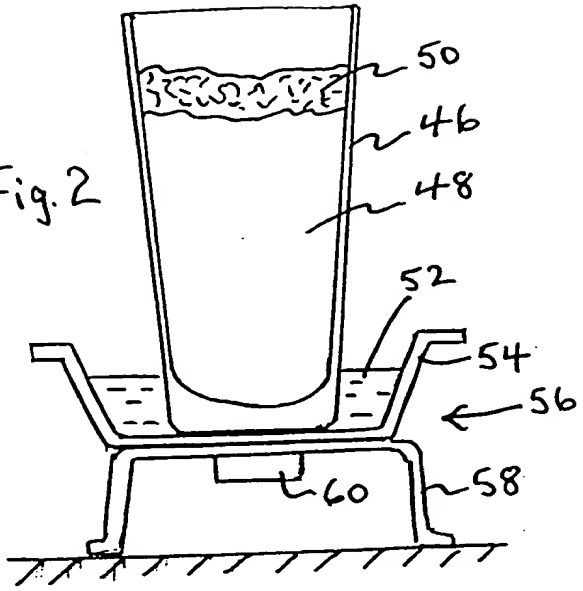

Fig. 2

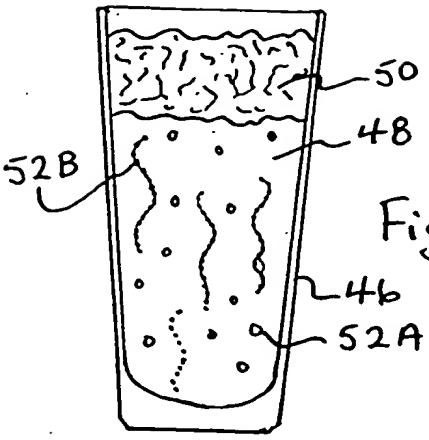

Fig. 3

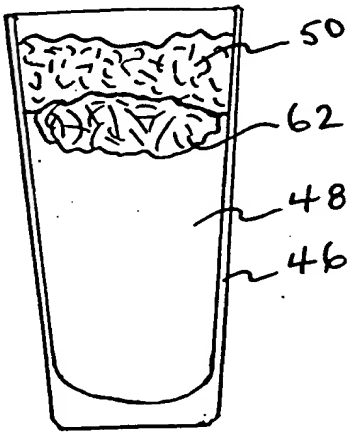

Fig. 4

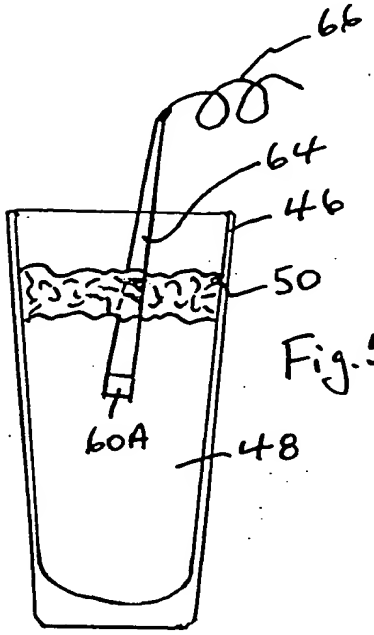

Fig. 5

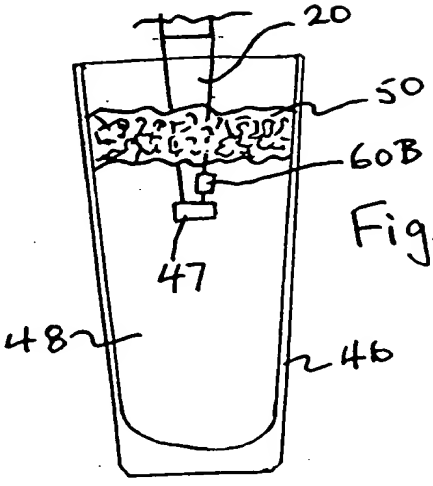

Fig. 6